Russian Journal of Plant Physiology 1997 vol.44 N1, pages 77-82

Estimation of the content of nitrogen-containing compounds and carbohydrates in developing amaranth plants by internal reflection spectroscopy in infrared light

Cherezov S., Zhirkova E., Plemenkova S., Ozhiganova G.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Multiple-disturbed total internal reflection spectroscopy in infrared light was used to examine developmental changes in the content of carbohydrates and nitrogen-containing compounds in different organs of Amaranthus cruentus (L.). Leaves, roots, and various stem zones exhibited asynchronous (opposite phase) oscillations in the content of these compounds, with the amplitude of oscillations being at its highest during vegetative growth and decreasing during subsequent phenological phases. A high extent of coordination and seasonal rhythmicity of carbohydrate and nitrogen metabolism was found in each of the plant organs; these processes were also coordinated between different organs. The rhizosphere of amaranth displayed a high nitrogenase activity during the whole growing season.

Keywords

Amaranthus cruentus, Azotobacter, Carbohydrate and nitrogen metabolism, Oscillatory processes, Phases of development